# **Plants in the Human-Altered Environment (PHAE) Research Project**

**Module 3: Classify the land cover of your study site**

We will classify and estimate the area of cover within your study site in two different ways.

#### Part 1: Identifying land cover types with Google Earth

Return to your study site project on Google Earth and zoom into the frame to fill the screen. Identify and determine whether different types of land cover (Table 1) occur within your study site by looking at the satellite imagery (for example, is there pavement? trees? lawn?). Each land cover type has a variable code which is the abbreviated name used in the spreadsheets where our data will be entered for the EREN project.

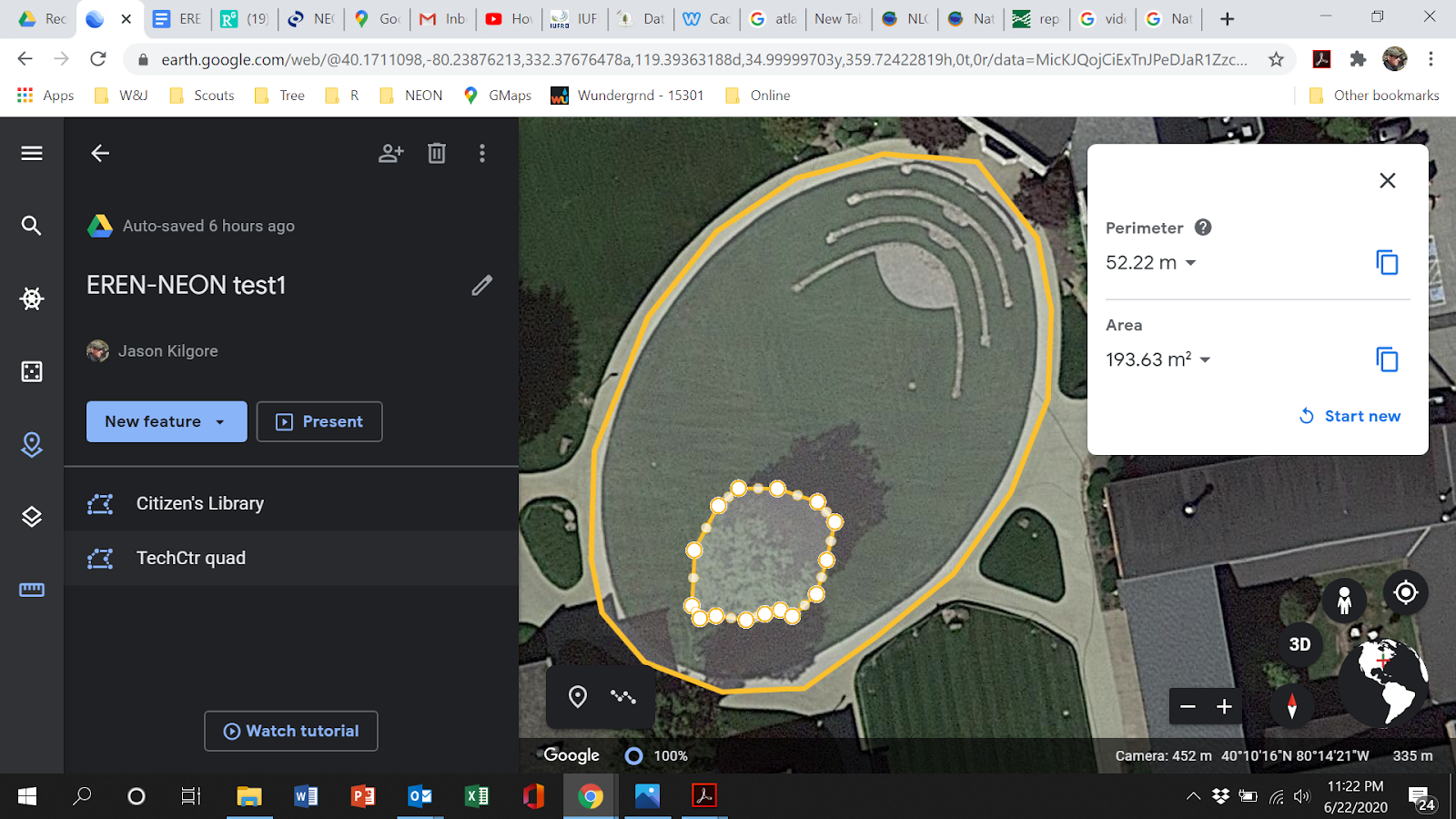
**Table 1. Land cover type variables.**

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| **Variable name** | **Variable code** | **Description** |
| impervious hard surface | imper.hd.surf | hard surface that prevents water infiltration into the soil, such as cement/asphalt sidewalk, road, roof, industrial equipment, packed-soil trails/roads |
| semipervious hard surface | semiper.hd.surf | impervious hard surfaces with pervious gaps, such as brick sidewalks, gravel walkways/driveways/roads |
| managed lawn | man.lawn | lawn (grass) that is actively managed (mowed) |
| managed landscape (unmown) | man.landsc | managed landscape beds containing flowers, shrubs, small trees, and/or mulch |
| cropland - rows | man.crop | row crops, such as corn, wheat, lettuce, beets, vineyards |
| cropland - no rows | man.fld | animal pasture or field that is managed for hay |
| unmanaged nonwoody vegetation | unman.fld | early successional habitat that is formerly managed and dominated by nonwoody plants; fallow fields; recurrently disturbed areas; prairies |
| scrub-shrub | scr.shr | canopy cover by woody plants (shrubs, young trees) less than 5 m in height, including regenerating forest |
| tree | tree | canopy cover by trees greater than 5 m in height |
| exposed soil | exp.soil | soil barren of any substantial vegetation |
| exposed rock | exp.rock | bare rock barren of any substantial vegetation |
| water | water | open water barren of emergent vegetation |

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| **Question:**  1) List the land cover types that are present in your study site. |

#### Part 2: Measuring land cover area with Google Earth

In Google Earth, use the Ruler tool  to outline and calculate areas for each of the land cover types. You may find this task easier if you measure the total area of the study site, then measure and subtract easily identifiable land cover types, like managed lawn or tree canopy (Figure 1), sum the individual areas for each of these cover types, then subtract from the entire area for the most difficult cover type.



**Figure 1. Delineated land cover type of tree canopy within a managed lawn in the study site.** You can find the area of the lawn by taking the area of the oval, and subtracting the area of the tree.

Record the areas for each of your land cover types below. Make sure they add up to your total site area.

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| Site name:   1. Total area of site: 2. List land cover types and areas of each below: |

While tree canopy can be visualized in aerial images taken during the growing season, estimating canopy area for deciduous trees from aerial images taken during the dormant season can be tricky. In addition, shrub canopy is difficult to see if it is hidden below tree canopy. You may need to visit your study site to identify overlapping canopy areas or to differentiate shrub and tree canopy, and then do your best to estimate these areas in Google Earth.  (If you can’t visit your study site right now, make a note of any ambiguous land cover types so you can double-check them when you visit the site in future.)

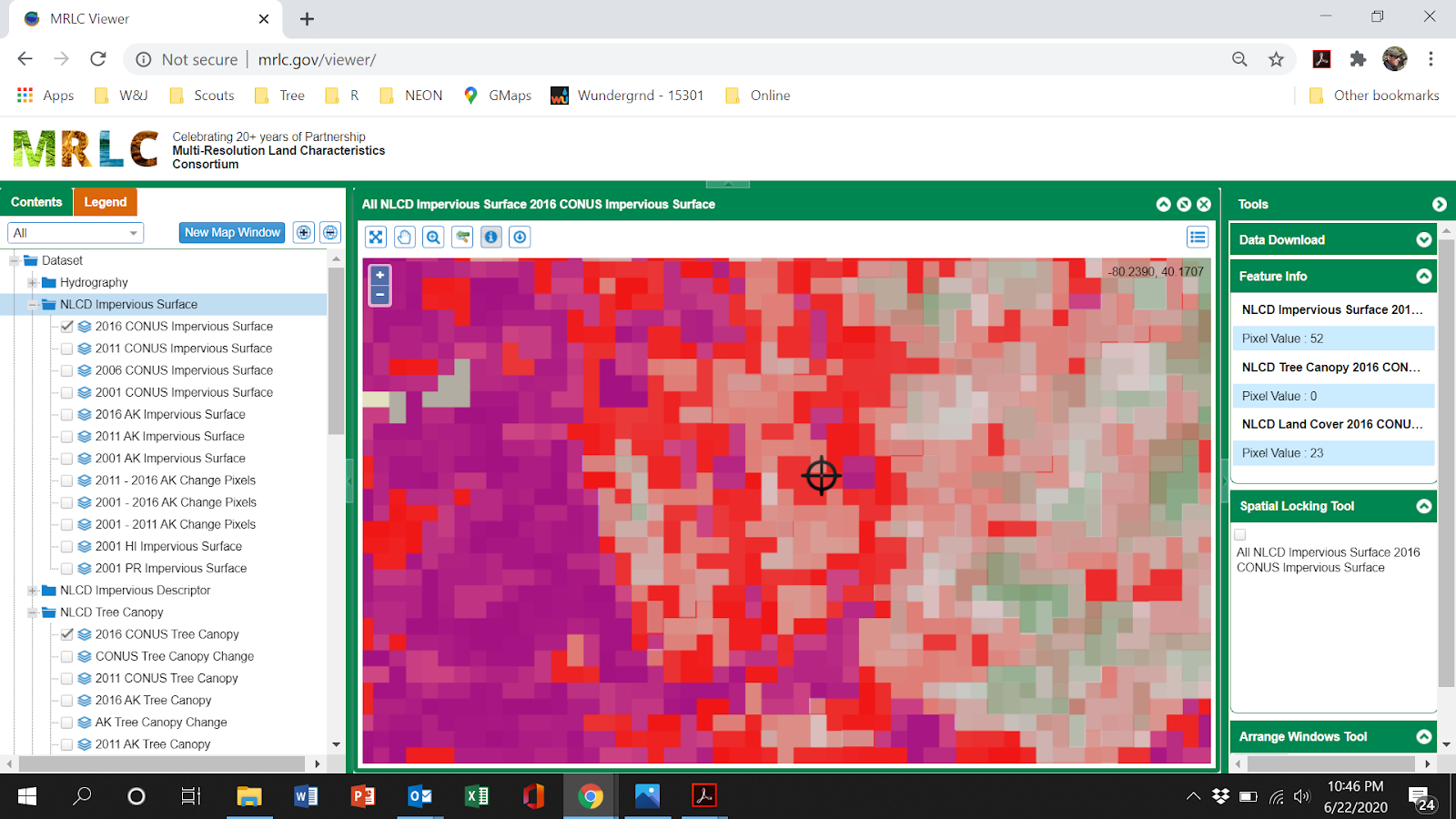
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| **Question:**   1. Is tree canopy clearly present in your delineated study site? Is shrub canopy clearly present in your delineated study site? Could shrub canopy exist under the tree canopy? |

#### Part 3: Measuring land cover with the National Land Cover Database

We will now determine the land cover type as interpreted by remotely sensed data (NLCD 2016). Go to the online [MRLC Viewer](https://www.mrlc.gov/viewer/). On the left panel, choose the Contents tab, and check the boxes for “2016 CONUS Impervious Surface”, “2016 CONUS Tree Canopy”, and “2016” CONUS Land Cover”. You will have to click on the folder for each of these categories to open up the checklist that lets you choose 2016. Uncheck the boxes for Alaska (AK), if they are checked.

You may already notice different colors on the map. Use the pan and zoom features to zoom in to your study area – this map doesn’t let you type in a location, so you will have to drag the map around and zoom in to find your best estimate of your site’s location. Click on the “Identify tool” . As you move your cursor across the image, the latitude and longitude appear in the upper right corner of the image; zoom around until the coordinates match your study site’s and click on the map at that location (see Figure 2).

In the right panel, under “Feature Info,” you will see “pixel values” for Impervious Surface (%), Tree Canopy (%), and Land Cover type. These are the measurements for each of those variables at that exact point. Transcribe these data to the appropriate column (variable) and row (your project) in the box below.



**Figure 2. Example land cover type map from NLCD (2016).** The “target” is located at the coordinates for the center of the study site polygon and sits on a 30-m x 30-m grid cell with 52% impervious surface, 0% tree canopy, and land cover type of 23, which is “Developed, Medium Intensity”.

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| **Questions:**  What values do you get for your study site for:   1. Impervious Surface (%) - 2. Tree Canopy (%) – 3. Land Cover Type (#) - 4. What is the description for your study site’s Land Cover Type (see the Legend tab)? |